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ABSTRACT

The topic for this paper developed as a result of observations made during the course of a joint Internet pilot project with K-12 teachers and administrators in the city of Saskatoon (Canada); the project was designed to determine the amount of professional development time the participants needed to become functional Internet users and to explore ways of integrating network resources into classroom instruction. This paper discusses how to contend with four potential "speed bumps" on the Information Highway. As exemplified in the pilot project, classroom teachers will not integrate network technology into their instruction any more quickly than they have adopted other forms of technology; until teachers are made more comfortable using computers, there will be no significant change in instructional practices. Networked information services can meet the needs of users only if such services are easily accessible; educational administrators and decision-makers must be prepared to allocate sufficient funds and human resources to support this technology. The quality and quantity of information available on the Internet demonstrates the need for development of analytical skills in selection and evaluation of educational technology. Finally, when integrating networked technology, professional development is important in order to provide teachers with time saving action plans, menus of activity structures, site addresses and resource lists. (Contains 13 references.) (AEF)

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SPEEDBUMPS ON THE INFORMATION HIGHWAY

A paper prepared for the annual conference of the Association for Educational Communications and Technology

InCITE'96
held in
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Introduction

The topic for this paper developed as a result of observations made during the course of a joint Internet Pilot Project with K-12 teachers and administrators in the City of Saskatoon. The project was designed to determine the amount of professional development time the participants needed to become functional Internet users and to explore ways of integrating network resources into classroom instruction. 36 teachers and administrators were participants in this project.
The purpose of this presentation is to identify some of the potential speed bumps located in the literature and on the Information Highway so that other travelers have a better chance of avoiding them.

Speedbump No. 1 - avoid the great debate.

Summaries of research comparing one media format with another generally come to the conclusion that both the new media and teacher deliver information in the classroom with nearly equal effectiveness. As Snider has observed, two findings echo again and again through the archives of the AERA: "There is no significant difference" and "there is a need for further study." (Snider, 1992, p. 318) While the terminology used here may be new, the basic idea is not. In 1992, Snyder observed that "beginning with the magic lantern and the stereoscope of 1900's, machines in the classroom have generated some promise, a fair amount of controversy, and a great deal of hype." (Snider, 1992, p. 316) Given the recent amount of public attention attributable to the Internet, this innovation in education seems to be following the same pattern.

This is not surprising because in 1984, John Goodlad (1984), in his now famous study entitled *A Place Called School*, suggested that the technological revolution appeared "to be sweeping around schools, leaving them virtually untouched." While there are examples of innovative schools that exemplify ideal ways in which to use various forms of technology in the classroom, chalkboards, lectures and textbooks continue to be the most popular form of media available in classrooms everywhere. The project participants have a demonstrated track record of being successful teachers or they would not be employed as teachers in our system. While they were voluntary participants in the project, they were not willing adopt a new form of media just because it happened to become popular. By the end of the project, 25% use little if any resources, 50% sampled the resources and 25% became frequent users. Only two gave students access to the Internet.

Classroom teachers will not integrate network technology into their instruction any more quickly than they have adopted other forms of technology. Until teachers are as comfortable using a computer and to access the Internet with the same ease as they use the resource room, there will be no significant change in instructional practices in the classroom. What are some of the available options make teachers feel more comfortable?

Speedbump No 2. - overcome access logistics.

Networked information services can meet the needs of users only if such services are easily accessible. Even though the Internet and other electronic networks have been labeled as the Information Superhighways, when compared to our existing school and public library systems, they are still in the very early stages of development.

To be practical in an everyday classroom setting, access to multimedia files has to be has to be fast and efficient. In the DOS world this means that every student would have to be equipped with a Pentium based machine with 16 meg. of RAM, a large hard drive, CD-ROM drive and 28.8 K modem in order to access sufficiently robust learning resources. If cooperative and collaborative learning strategies mandate the rapid exchange of interpersonal communications, then each learner will require a network connection. Does this mean that each desks will have to be wired with a network connection? Assuming all students have the necessary hardware and network access, who pays for the on-line access time? Is this cost, like the cost of textbooks, paid for through taxation as part of the cost of running an institution? Or, will it be passed on to the parent?

Finally, increasing numbers of users and increasing complexity of services and resources available place increasingly heavy demands on the capacity of networks to transmit bits and bytes. How do we cope with network "traffic jams" in the middle of guiding or conducting instructional activities? Can we be assured of 100% reliable access to learning resources at all times during the normal school day.

Why do children need powerful computers? The most powerful computers should be in the hands of expert users. Chris Dede (1989), a futurist now resident at George Mason University pointed out that the opposite is true because the power user can focus on the application itself and do not need any scaffolding. Novice users need all the on-line help files, coaching routines and user friendly graphical interfaces that are available. All of these aids consume substantial amounts of memory, storage space and computing power.

Educational administrators and decision-makers must be prepared to allocate sufficient funds and human resources to support network technology, just as they currently do for textbooks and school libraries. Information available from Web66 web site gives a good thumbnail sketch of what is involved in setting up and maintaining a network in a K-12 school setting. If they are unable or unwilling to provide these resources, one alternative is to consider out-sourcing Internet access to a local service provider. Because of the logistics and cost involved in providing this service, perhaps the school is the wrong place to place Internet access points. Homes and/or traditional libraries may be a reasonable alternative.

Speedbump No. 3 - the quest for quality and quantity.

The only thing constant about the voluntary placement of learning resources on the Internet is change. Consequently, there is little organization, no classification system and no quality control over what type of information that is placed in computer files. The real world equivalent of having access to the Internet is analogous to having access to a library in which the books are stored by size and color. As a result, finding what you need when you need it can be equivalent to the search for the holy grail.

Morton et. al. (1989) envision access to an international communications network changing a didactic classroom environment into a problem solving environment based on student generated learning in global classrooms. While their vision may have merit, at the moment trying to locate specific resources by trial and error searching is not a very efficient use of time. Granted search tools like the Webcrawler and Infoseek may make the task easier, but they are in no way comparable to being able to use a controlled vocabulary system like the one found in the ERIC Thesaurus or the list subject headings from the Library of Congress.

The quantity of resources in any specific subject area is extremely variable because resources are posted on the network voluntarily by users who have interest and hopefully some expertise in a particular topic area. The network depends on the fact that they and are willing to work collaboratively with other users on the basis that you are welcome to use my resources if I may use yours resources when I need them. The end result of this approach is that for popular topics like art and art history, a great deal of information may be available. Less popular topics like English grammar may have little if any information available. Other topics may have nothing.

Journalists like Schwartz (1993), in writing an editorial for Sunday Washington Post expressed a concern about students having easy access to pornographic materials and the risk of their becoming addicted to mindless games like Dungeons & Dragons. The public expression of this type of concern has raised an equal amount of concern about censorship and the control of information that is allowed to enter schools. The American Library Association guidelines make it clear that such blocking of information violates the freedom of access to information which should be a family

decision, not a school administrator's decision. (ftp://ftp.eff.org/pub/CAR/library/access.minors.ala) To see how this approach translates into school district policy and procedures check out the Bellingham Public Schools page at http://www/bham.wednet.edu.

The quality and quantity of information available on the Internet points out the need for development of analytic skills in selection and evaluation. Occasionally the apparent ease of obtaining an several answers to a question on a popular topic may hide from students the need to sift through information to identify the best answer. Connell & Franklin (1994) remind us that finding the best answer requires defining what is best. Is it accuracy, currency or user usefulness?

At least some of the attractiveness of telecomputing lies in the interactive capabilities and the immediacy of this tool. Instead of adopting a punishment stance to combat a youthful urge to access inappropriate materials, a more productive and long lasting approach lies in identifying infractions of school policy as "teachable moments". Here is a good opportunity for the teacher to discuss what is appropriate and what is not appropriate material to use in school. Few if any situations encountered on the net are much different than those encountered in real life or observed other media. For example, Playboy has both a home page on the net and a magazine which is easily available from your friendly corner store. Realistically, why should this type of material be treated any differently because it is on the net than when it is off the net.

Speedbump No. 4 - make time for professional development.

Traditional approaches to education have long been based on a teaching-learning relationship that is founded on the process of knowledge transfer. Teachers "know" and through clear logical explanation and demonstration, they are able to transfer what they know to those who do not know. Organizations like the Information Highway Advisory Council Secretariat often call for retraining because teachers need to understand and use the technologies so that they, in turn, can facilitate learning on the Information Highway. (Information Highway Advisory Council Secretariat, 1995, p. 64.)

Surveys of teacher opinion frequently report that teachers are afraid of the computer because of the potential for role reversal. Traditionally, the teacher, not the students, has been expected to be in control. Hawkridge (1993) suggests that information technology may change that situation by placing students in control of their own learning. Teachers may then become "technicians, selectors of courseware, individualisers of instruction, managers, schedulers and advisers". (Hawkridge, 1993, p. 156) In addition to concern for losing control, Wiske et al. (1990) found that some teachers were afraid of looking stupid in front of a class because they did not know what they were doing when trying to use the technology.

We are all aware that there are many demands on a teacher's time. Supervision, instructional, co-curricular and extra-curricular responsibilities and activities consume most of their available time during the academic term. Add in the time required for family and social obligations and there is not much time left to waste trying to learn how to use user-hostile computer systems.

In an era when broadcast television was a new technology, production personnel used radio broadcast techniques to deliver programs on this new radio that also transmitted pictures. They literally stood in front of the camera and read the script for a commercial while looking into the camera. Compared to the commercials that are on television today, it was obvious that they needed professional development time and retraining in order to learn how to use the new communications technology. Could they have been any less apprehensive about "goofing up" in a live production than teachers who are now faced with the prospect of having to use a new communications technology without any time to learn how to do it?

Harris, (1994), make the point that independent learning for teachers "is probably the most time-consuming and frustrating way to learn, because of the highly ambiguous and changing nature of the Internet, and the cumbersome characteristics of many of its procedures." (Harris,1994, p. 61) User-friendly software and distributed hands-on experience over several months can do much to eliminate a novice user's fear of computers. Teachers, like their counterparts in television production have to have time learn how to use the medium. If busy people are going to consider using network technology, the technology it has to be transparent. Systems must be reliable and easier to use than not use. Teachers need to have easy access to time saving action plans, menus of activity structures, site addresses, and resources lists. In other words, like the print-based resources they are used to using, give them the resources and then let them put their own spin on it.

Conclusions

Do teachers really have a low level of technological literacy? Over the last two decades, software developers like the Minnesota Ed. Computing Corp. has marketed their services to thousands of school boards located all over the continent. SchoolNet, an initiative of the Canadian Government's Department of Industry and Science to connect all schools in Canada to the Internet, reports that there are now over 3,500 schools registered on their system at Carleton University. Web66, an international school web page registry housed at the University of Minnesota, reports that almost 2,500 schools have registered web home pages on their site. Big Sky Telegraph in Montana and FIRN in Florida are state supported initiatives to get teachers communicating with each another over the network. Schools all over the continent have labs populated with microcomputers use the standard applications programs in the teaching almost all subject areas. There is approximately an average of one microcomputer per teacher in every school in the continent. To use the blanket statement that teachers are technologically illiterate may serve the needs of a particular interest group, but may not reflect reality in the teaching profession.

Network resources like traditional resources are tools. Teachers should object to information technology being sold as a panacea for problems in education often brought on by other factors in society. The spin-off of using text as a new tool for communication was the development of a public education system, the Protestant Reformation, and departure from oral tradition as a means of storing and retrieving knowledge. Internet technology still has a long way to go before it's influence has as dramatic an effect on society.

The reasons teachers frequently give for not using technology in the classroom are more often related to administrative than academic concerns. Administrative concerns such as the lack of sufficient hardware, preparation time, system reliability, and technical support are frequently identified as barriers to integrating network technology into classroom instruction.
Harris (1994) citing Rogers' (1986) study of innovation in communications points out three ways in which innovation in communications differ from other innovation in other areas. First, a critical mass of adopters must be using the innovation in order to persuade potential adopters to do the same. Telecommunications networks will not readily be used by teachers until a noticeable community of educators and/or information resources designed specifically to support K-12 education are available on-line. Second, the degree of use of a communications innovation rather than the decision to adopt it is the dependent variable that will indicate the success of the diffusion effort. Teachers will only use network tools and resources if they use them regularly and frequently. Third, new communication technologies are tools that can be applied in many different ways and for different purposes. Adoption of these innovations is an active process that involves much reinvention. Teachers must be willing to take the innovation and make it their own if they are going to continue using it.

As past experience has demonstrated, the introduction of a new technology by itself will not likely ever revolutionize education or even influence the efficient operation of a classroom. The introduction of technology into the classroom carries with it plethora of political, economic, social, and organizational issues. There are many parallels that can be drawn between the diffusion and adoption of text technology and the diffusion and adoption of network technology. Text, complimented by sound and images, will for the foreseeable future be a dominate form of communications. The demand for immediacy of delivery of text may eventually may influence how we do business in the classroom if we can avoid being oversold on the idea that all of life's little problems can be easily solved if only we can be connected to the Internet.

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